

What is claimed is:

1. An optical semiconductor device comprising:

2 an optical semiconductor element formed on a
3 semiconductor substrate;

4 a semiconductor region opposing said optical
5 semiconductor element and essentially surrounding said
6 optical semiconductor element to form walls; and

7 a buried layer arranged between the walls of
8 said semiconductor region and said optical semiconductor
9 element and formed by vapor phase epitaxy,

10 wherein a distance between the wall of said
11 semiconductor region and a side wall of said optical
12 semiconductor element is larger in a portion in which a
13 growth rate of the vapor phase epitaxy in a horizontal
14 direction from the side wall of said optical
15 semiconductor element and the wall of said semiconductor
16 region is higher.

2. A device according to claim 1, wherein

2 said optical semiconductor element has a
3 stacked structure of Group III-V compound semiconductor
4 layers made from In, Ga, Al, P, and As, and

5 said buried layer is made from semi-insulating
6 InP.

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3. A device according to claim 1, wherein said
2 buried layer has a multilayered structure.

4. A device according to claim 1, wherein
2 said device further comprises an electrode
3 connected to said optical semiconductor element,
4 said electrode is formed on said semiconductor
5 region via an insulating layer, and
6 trenches are formed in a portion of said
7 semiconductor region below said electrode and buried
8 with said buried layer.

5. A device according to claim 4, wherein said
2 trenches are wider in a portion in which the growth rate
3 in the horizontal direction from side walls of said
4 trenches is higher.

6. A device according to claim 4, wherein
2 said optical semiconductor element has a
3 stacked structure of Group III-V compound semiconductor
4 layers made from In, Ga, Al, P, and As, and
5 said buried layer is made from semi-insulating
6 InP.

7. A device according to claim 4, wherein said
2 buried layer has a multilayered structure.

8. An optical semiconductor device comprising:
2 a plurality of optical semiconductor elements
3 formed on a semiconductor substrate;
4 a dummy portion formed in a center of a square
5 at four corners of which said optical semiconductor
6 elements are arranged; and
7 a buried layer formed by vapor phase epitaxy
8 so as to bury a portion between said optical
9 semiconductor elements and said dummy portion.

9. A device according to claim 8, wherein
2 said optical semiconductor element has a
3 stacked structure of Group III-V compound semiconductor
4 layers made from In, Ga, Al, P, and As, and
5 said buried layer is made from semi-insulating
6 InP.

10. A device according to claim 8, wherein said
2 buried layer has a multilayered structure.

11. A device according to claim 1, wherein said
2 buried layer is made from a semi-insulating
3 semiconductor added with a dopant which forms an
4 impurity level in a deep level in a band gap.

12. A method of fabricating an optical
2 semiconductor device, comprising:

3 the first step of forming an optical
4 semiconductor element on a semiconductor substrate;
5 the second step of forming a semiconductor
6 region having walls opposing said optical semiconductor
7 element and essentially surrounding said optical
8 semiconductor element; and

9 the third step of forming a buried layer by
10 vapor phase epitaxy between the walls of said
11 semiconductor region and said optical semiconductor
12 element,

13 wherein in the second step a distance between
14 the wall of said semiconductor region and a side wall of
15 said optical semiconductor element is larger in a
16 portion in which a growth rate of the vapor phase
17 epitaxy in a horizontal direction from the side wall of
18 said optical semiconductor element and the wall of said
19 semiconductor region is higher.

13. A method according to claim 12, wherein said
2 buried layer is formed by vapor phase epitaxy using one
3 of a chloride-based source gas and a hydride-based
4 source gas.

14. A method according to claim 12, further
2 comprising
3 the steps of forming trenches in a
4 predetermined region of said semiconductor region before

5 the third step, said trenches being buried with said
6 buried layer in the third step, and
7 the step of forming an electrode to be
8 connected to said optical semiconductor element on said
9 trenches via an insulating film.

15. A method according to claim 14, wherein said
2 trenches are wider in a portion in which a growth rate
3 in a horizontal direction from side walls of said
4 trenches is higher.

16. A method according to claim 12, wherein said
2 buried layer is formed by vapor phase epitaxy using one
3 of a chloride-based source gas and a hydride-based
4 source gas.

17. A method of fabricating an optical
2 semiconductor device, comprising the steps of:
3 forming a plurality of optical semiconductor
4 elements on a semiconductor substrate;
5 forming a dummy portion in a center of a
6 square at four corners of which said optical
7 semiconductor elements are arranged; and
8 forming a buried layer by vapor phase epitaxy
9 so as to bury a portion between said optical
10 semiconductor elements and said dummy portion.

18. A method according to claim 17, wherein said
2 buried layer is formed by vapor phase epitaxy using one
3 of a chloride-based source gas and a hydride-based
4 source gas.

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